

NAI's core competencies run the gamut from nuclear detection and remote sensing to intelligence analysis and threat assessment to emergency response

Broad Capabilities

The Nonproliferation, Arms Control, and International Security (NAI) Directorate draws on a spectrum of laboratory strengths as it carries out its mission to provide technology, analysis, and expertise to counter the proliferation of weapons of mass destruction. Our core competencies include:

- Nuclear detection.
- Nuclear materials control.
- Sensors and remote monitoring.
- Forensic science.
- Intelligence analysis.
- Conflict simulation.
- Threat assessment.
- Emergency response.

Nuclear Detection

As a result of decades of work in nuclear weapons science and technology, Livermore has world-class capabilities in nuclear detection. We have developed and demonstrated myriad detection technologies, including neutron, gamma-ray, and x-ray imaging, passive and active neutron and gamma detection, and various remote and unattended systems.

Nuclear Materials Control

Also as a result of the Laboratory's nuclear weapons and nuclear testing work, we have developed extensive capabilities in the control, tracking, accountability of nuclear materials. Detection and monitoring technologies are combined with procedural and systems analysis to provide for the safe use and secure storage, transportation, or disposal of nuclear materials.

Sensors and Remote Monitoring

The Laboratory's need to understand complex phenomena, ranging from nuclear explosions to the behavior of materials on a microscopic level, has driven the development of state-of-the-art instrumentation for detecting, measuring, and analyzing a wide range of physical phenomena. Concurrent development of fiber optics, microelectronics, and data-manipulation techniques have given us the capability to design and build sophisticated measurement and information-processing systems.

Forensic Science

Forensic science is the comprehensive scientific analysis of physical evidence in the context of civil, criminal, or international law. Forensic science is also used to monitor or verify compliance with international treaties and agreements limiting the development, production, or use of weapons of mass destruction. With our comprehensive array of ultrasensitive capabilities in analytical, organic, and inorganic chemistry as well as in nuclear science, toxicology, pharmacology, and metallurgy, we can completely characterize virtually any sample and detect virtually any target compound.

Intelligence Analysis	Laboratory expertise in nuclear weapons, nuclear testing, and chemical and biological science allows us to evaluate foreign nuclear weapons programs for the U.S. intelligence community. Multifaceted analyses, incorporating technical, economic, political, and other drivers, help the U.S. avoid surprise regarding foreign weapons programs and support national efforts to prevent, reverse, and respond to weapons proliferation threats worldwide.
Conflict Simulation	Expertise and capabilities developed through studies of nuclear and conventional weapon warfare are applicable to counterproliferation analyses. Laboratory strengths in computational modeling have been applied to the development of high-resolution, interactive simulations of counterproliferation, military combat, drug interdiction, and law enforcement scenarios.
Threat Assessment	Threat assessment is a critical step in preventing, reversing, or responding to the proliferation of weapons of mass destruction (WMD). Livermore's expertise in nuclear weapons science and technology, intelligence analysis, and forensics allows us to provide credible assessments of WMD threats. We evaluate the validity and characteristics of suspected proliferant threats, nuclear hoaxes, terrorist activities, and other threats for U.S. law enforcement and intelligence agencies.
Emergency Response	During the 50-plus years of the nuclear era, the U.S. has responded to various nuclear-related incidents. LLNL has been a key player in many of these response efforts. We develop and demonstrate laboratory and field analytical capabilities, technologies for device disablement, and operational procedures for emergency response. Similar capabilities are being developed to respond to incidents involving biological and chemical weapons.
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